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MILITARY SPECIFICATION

BARRIER MATERIALS, TRANSPARENT, FLEXIBLE, SEALABLE, VOLATILE CORROSION INHIBITOR TREATED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers transparent, flexible, barrier materials treated with a volatile corrosion inhibitor and sealed by heat or pressure as applicable. The materials shall be used in accordance with MIL-I-8574 (see 6.1).

1.2 Classification. The treated barrier materials shall be of the following types as specified (see 6.2).

Type I - Heat Sealable
Type II - Pressure (cold) Sealable.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitations for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

QQ-C-576	Copper Plates, Rolled Bars, Sheets and Strip.
TT-S-735	Standard Test Fluids; Hydrocarbon.
TT-T-291	Thinner, Paint, Volatile Mineral Spirits (Petroleum-Spirits).

FSC 8135

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PPP-B-636	Box, Fiberboard.
PPP-B-640	Boxes, Fiberboard, Corrugated, Triple Wall.
PPP-D-723	Drums, Fiber.
PPP-T-60	Tape, Pressure-sensitive, Adhesive, Waterproof for Packaging.

Military

MIL-B-131	Barrier Material, Water Vaporproof, Flexible.
MIL-S-4461	Sealing Machines, Heat, Bench and Portable (Temperature, Pressure and Time Controlled).
MIL-T-7807	Thread, Nylon.
MIL-I-8574	Inhibitors, Corrosion, Volatile, Utilization of.

STANDARDS

Federal

FED-STD No. 101	Preservation, Packaging and Packing Materials; Test Procedures.
Fed-STD No. 595	Colors.

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	Marking for Shipment and Storage.

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(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Qualification. The treated barriers furnished under this specification shall be products which have been tested and have passed the qualification tests specified herein, and have been listed on or approved for listing on the applicable qualified products list.

3.2 Materials. Treated barriers shall be made from such materials and by such processes as to assure compliance with this specification.

3.2.1 Composition.

3.2.1.1 Type I. Type I material shall be heat sealable and treated with a volatile corrosion inhibitor which will ensure compliance with the performance requirements of the specification.

3.2.1.2 Type II. Type II material shall be coated on one side with a cohesive substance, treated with a volatile corrosion inhibitor and shall be capable of being cold sealed by pressing the coated sides together.

3.2.2 Toxicity. When used for its intended purpose, the treated barrier shall have no adverse effect on the health of personnel. (see 5.4.1.1.)

3.3 Sizes. Types I and II treated barrier shall be furnished in rolls. Flat cuts shall be furnished for Type I only. Unless otherwise specified (see 6.2), rolls shall be 36 inches wide by 200 yards long. The tolerance on the width shall not exceed ±1/8 inch, and the length shall not be less than 195 yards of usable material. Cut sheets shall be furnished in sizes as specified (see 6.2), tolerance in length and width shall not exceed ±1/8 inch.

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3.4 Identification.

3.4.1 Material. The barrier shall be marked to show the following: Manufacturer's designation, date of manufacture (month and year), specification number, type number, lot number, and with notation "Seal Other Side." The identification shall appear in continuous rows of constantly recurring symbols in the machine direction from one end of the sheet to the other. Type I symbols shall be of a permanent yellow color approximating chip number 33793 of FED STD No. 595. Type II symbols shall be of a permanent green color approximating chip number 34138 of FED STD No. 595. All symbols shall be clearly legible and not less than 1/16 inch high. All symbols shall be applied by suitable means using marking fluid that is not deleterious to the barrier. The markings shall not be obliterated by the normal handling or the action of water. The parallel rows of recurring symbols shall appear at a maximum of 2-1/2 inches apart. Printing shall be alternating in accordance with the example shown below.

Mfr's Designation Date of Mfr Spec No. Type No. Lot No. Seal other side

Seal other side

Spec No. Type No. Lot No. Mfr's Designation Date of Mfr

3.4.2 Identification sheets. Identification sheets shall accompany each roll or bundle and shall contain the following markings: Specification number, type number, lot number, manufacturer's name, manufacturer's product designation, manufacturer's sealing conditions, and month and year of manufacture.

3.5 Sealing. Type I and Type II treated barriers shall be capable of being sealed under conditions recommended by the manufacturer. These sealing conditions shall be such as are considered reasonable for production line sealing operations with respect to commonly available sealing equipment and commercially practical fabrication time.

3.6 Physical properties. When tested as specified in Section 4, the Type I and Type II treated barriers shall comply with the requirements indicated in Table I.

3.7 Workmanship. Finished material supplied under this specification shall be coated or impregnated treated barrier and shall in the case of coated barrier show no appreciable loss of coating as evidenced by the nonuniform appearance of voids in the VCI coating substrates or cohesive, as applicable. Finished material shall be uniformly constructed and free from defects which would impair its usefulness.

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TABLE I. Physical properties

Properties	Requirements	Test para. No.
Compatibility with copper...	No pitting, etching or severe discoloration of vapor exposed copper surface, discount attacks within 1/16 inch of specimen.	4.9.1
Vapor inhibitor ability (VIA)	No corrosion, etching or pitting of polished surface of steel panel.	4.9.2
Vapor inhibitor ability after exhaustion.....	Comply with requirements of VIA test.	4.9.2
Contact corrosivity	Treated and untreated barrier shall not cause corrosion, etching, or pitting within test area of panel.....	4.9.2
Long term protection	No corrosion of steel panels (to comply with transparency requirement).....	4.9.3
Seam strength		4.9.4
As received	Shall not exceed 50% separation	4.9.4.2
Sealed after aging.....	Shall not exceed 50% separation	4.9.4.3
Oil resistance	No leakage, swelling, delamination or embrittlement	4.9.5
Blocking resistance	No blocking, delamination or rupture	4.9.2
Low temperature flexibility	No delamination, cracks, or tears.....	4.9.6
Water resistance of marking	Markings shall be clear and legible.....	4.9.2
Seam and material water resistance	Seams as well as the barrier shall resist penetration of water.....	4.9.7
Transparency	Lettering shall be clear and legible.....	4.9.2
As received	Lettering shall be clear and legible.....	
After aging at 150°F for 12 days.....	After storage, test for compliance with Seam Strength, VIA and Transparency requirement.....	
Puncture resistance.....	Type I - Min.Force 10.0 pounds Type II- Min. Force 6.0 pounds	4.9.2
Tearing strength.....	(Elmendorf) 20(grams-min).....	4.9.2
Storage stability.....	One year storage (see 4.9.8).	4.9.8

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4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of inspection - The inspection requirements as specified herein are classified as follows:

(a) Qualification inspection - Qualification inspection consists of tests accomplished on samples submitted as a satisfactory product. The qualification tests of the barrier material shall consist of all of the tests of this specification. Temporary approval will be granted prior to completion of the storage stability test and long term protection test provided the material meets all other requirements (see 4.3).

(b) Quality conformance inspection - Quality conformance inspection consists of examinations and tests performed on barrier material submitted for acceptance under a contract or order. The quality conformance tests shall consist of tests listed in 4.4.1.4 and examinations listed in Table II.

4.3 Qualification inspection -

4.3.1 Qualification sampling instructions - Qualification inspection samples shall consist of 10 square yards of untreated and 50 square yards of treated material of each type of material upon which qualification is desired. Samples of the treated and untreated materials shall be encased in separate packages. The contractor shall submit with the qualification samples a certified copy of test results showing conformance with all the requirements of this specification except the Long term protection and Storage Stability tests. In addition, the report of tests shall specify:"Identification of inhibitor, binder and plastic sheet". Information shall be furnished including the plant address(es), as to the plant(s) in which the barrier material is, or will be manufactured. If more than one address is listed, a certificate of equivalence of other plants to the plant in which the sample was manufactured must be furnished. The samples shall be forwarded to the Supply Officer, Naval Air Development Center, Warminster, Pennsylvania 18974, Attention: Director, Aero Materials Department, plainly identified by securely attached durable tags marked with the following information.

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Sample for Qualification Tests
BARRIER MATERIAL, TRANSPARENT, FLEXIBLE, SEALABLE, VOLATILE CORROSION INHIBITOR TREATED
Manufacturer's Name
Manufacturer's Code No.
Type No.
Date of manufacture (month and year)
Submitted by (name) (date) for qualification tests in accordance with requirements of Specification MIL-B-22019C under authorization (reference authorizing letter)

4.3.2 Retention of qualification - The retention of qualification of products approved for listing on the Qualified Products List (QPL) shall be maintained by periodic verification to determine compliance of the qualified product with the requirements of this specification. Unless otherwise specified by the activity responsible for the Qualified Products List, periodic verification shall be by certification and such certification shall be at intervals of not more than two years.

4.4 Quality conformance inspection - Quality conformance inspection shall be in accordance with MIL-STD-105 except where otherwise indicated hereinafter. The contractor shall furnish all samples. Unless otherwise specified, the contractor shall be responsible for accomplishing the required quality conformance tests listed in 4.4.1.4 and examinations listed in Table II. Check tests may be performed at the discretion of the inspection activity at a Government laboratory for information, verification and correlation purposes. Quality conformance testing will be performed at a designated laboratory when results of check tests so warrant. The contractor shall furnish test reports showing quantitative results for all quality conformance tests required by this specification for each lot of material. Any function specified herein for accomplishment by the Government will be interpreted to mean function to be accomplished either by or under the supervision of the Government.

4.4.1 Quality conformance inspection sampling -

4.4.1.1 Inspection lot - A quality inspection test lot shall consist of either 50,000 square yards of material or all material manufactured by the same process from the same components during one production run, whichever is the lesser.

4.4.1.2 Samples for test - Unless otherwise specified, sampling for inspection and tests shall be in accordance with MIL-STD-105. When requested in the contract or purchase order, the contractor shall furnish the results of all inspection and tests conducted.

4.4.1.3 Samples and acceptance criteria - The sample size and acceptance criteria shall be as specified in Table II. Sampling and acceptance or rejection shall be in accordance with MIL-STD-105.

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4.4.1.4 Quality conformance tests. Quality conformance tests for treated barrier shall consist of:

Tearing Strength.
Vapor Inhibitor Ability.
Vapor Inhibitor Ability after Exhaustion.
Contact Corrosivity.
Transparency (As received and after aging).
Seam Strength (As received and after aging).

TABLE II

SAMPLE SIZE AND ACCEPTANCE CRITERIA

Inspection characteristic	Rqmt. par.	Test method	Results rpt. as	Inspection level	AQL defects per 100 units
Examination of appearance and workmanship	4.5.2	--	--	S-4	4.0
Examination of rolls or packages of flat cuts	4.5.4	--	--	S-3	4.0
Examination of the end items for defects related to coating or impregnation	4.5.3	--	--	S-4	4.0
Examination of preparation for delivery	4.5.5	--	--	S-3	4.0
Quality conformance tests	4.4.1.4	4.9	Pass or fail or as applicable.	S-1	Acceptance number zero. Rejection number one.

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4.5 In process or end item sampling (Visual examination). Unless otherwise specified by the procuring activity having separate test instructions, examination of the end item shall be in accordance with the list of defects and Acceptable Quality Levels (AQL's) set forth in Table II. The Government reserves the right to require examination for any defect prohibited in Section 3 or in the contract or purchase order even though it is not listed below, and to classify such defects in accordance with the definitions contained in MIL-STD-105. Facilities shall be made available to the Government Inspector for conducting the examinations prescribed herein.

4.5.1 Material for examination and test. The rolls or packages of sheets examined under paragraph 4.5.3, shall be used for examination under paragraphs 4.5.2 and 4.5.4 and test under paragraph 4.4.1.4.

4.5.2 Examination of the end item for defects in appearance and workmanship. The sample unit for this examination shall be expressed in units of square yards of barrier material. Samples for examination shall be selected in accordance with Table II. Sufficient rolls shall be selected at random so that by examining approximately 15 yards per roll, the required yardage will be obtained. For examination of sheets, samples shall be scored only once for each occurrence within a square yard.

Examine	Defects
Check both sides of treated barrier.	
Form	Not rolled or flat cut, as specified.
Cleanness	Not clean.*
Workmanship	Delamination.
	Embrittlement.
	Any hole (excluding optical pinholes).
	Any tear.
	Any cut.
	Any chafed spot.

Workmanship defects do not apply to material within 2 inches of beginning or end of roll.

*Note. This defect does not apply to outer convolution of roll.

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Examine	Defects
Construction	Not uniform Any layer or section missing.
Identification of material (marking)	Not in continuous row of constantly recurring symbols. Not in machine direction. Legend not as specified in paragraph 3.4. Parallel rows over 2 1/2 inches apart. Markings less than 1/16 inch high. Type I markings do not approximate yellow color chip No. 33793 of FED STD NO. 595. Type II markings do not approximate green color chip No. 34138 of FED STD NO. 595. Markings are not of a permanent nature. Marking fluid deleterious to barrier. Printing is not alternating and not in conformance with example of paragraph 3.4.1.

4.5.3 Examination of the end items for defects related to coating or impregnation. The lot size for this examination shall be expressed in units of square yards of treated barrier. Sampling shall be selected in accordance with Inspection Level S-4 of MIL-STD-105 with AQL of 4.0 defects per 100 units.

Examine	Defects
Roll or Package of sheets.	Loss of coating or impregnation causing bald spots. Coating or impregnation completely missing. Granular sandpaper surface.

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4.5.4 Examination of the end item for defects related to the roll or package of sheets. The lot size for this examination shall be expressed in units of rolls or packages of sheets. Samples for examination shall be selected in accordance with Inspection Level S-3 of MIL-STD-105 with an AQL of 4.0 defects per 100 units.

Examine	Defects
Roll Width	More than 36 +1/8 inches Less than 35 -7/8 inches

Note. When other roll widths are specified, a tolerance of ±1/8 inch shall be allowed.

Examine	Defects
Sheet Width (Type I)	Greater than specified width by more than 1/8 inch. Less than specified width by more than 1/8 inch.
Sheet Length (Type I)	Greater than specified length by more than 1/8 inch. Less than specified length by more than 1/8 inch.
Unwinding of Rolls	When unwound, material sticks together to the extent that unrolling causes tearing or injury to surfaces (check both sides of material). Material not wound evenly. Telescoping. Rolls not wound on cores. Inside diameter of core less than 3 inches. Cores crushed, broken, mutilated, or collapsed. Rolls not closed at end by means of inside and outside headers. Rolls not wrapped with at least one thickness of MIL-B-131 Class 1 material. Material not in conformance with specification.

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Examine	Defects
Assembly on Roll	Not suitably restrained to prevent unwinding.
Sticking of Adjacent Sheets (Type I).	Sheets stick together to the extent that separation causes tearing or injury to the surface.
Length of Individual Roll.	Less than 195 yards of usable material*.
Count of Individual Package of sheets (Type I).	Exceeds 2 percent less than specified or indicated quantity.
Roll or package of sheets (Type I).	Identification sheet missing.

*The average roll length for the entire sample shall be not less than 200 yards. If the average for the sample is less than 200 yards, the lot shall be rejected.

4.5.5 Examination of preparation for delivery. The lot size shall be expressed in units of shipping containers (1 drum per roll; and bundle of flat cuts), and the sample units shall be one shipping container, fully packed and selected prior to the sealing or tying operation.

Examine	Defects
Packaging (as applicable)	Not level specified; not in accordance with contract requirements.
	Flat cuts not unit packaged and wrapped in bundles as specified; fiberboard pad(s) omitted from top or bottom of stack, or not of sufficient size to protect flat cuts in packaging; ties (tape, twine, or rope) not applied in manner specified; closures not accomplished by specified or required methods or materials.

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Examine	Defects
Packing (as applicable)	Not level specified; not in accordance with contract requirements. Rolls not packed in fiber drums, as specified. Arrangement or number of rolls or bundles of flat cuts per container not in accordance with requirements. Container materials not as specified; closures not accomplished by specified or required methods or materials.
Markings	Interior or exterior markings (as applicable) illegible, incorrect, omitted, or not in accordance with requirements. Precautionary markings omitted or not as specified (see 5.4.1).
Weight	Weight exceeds requirements.

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4.6 Sealing instructions for qualification and inspection testing.

4.6.1 Type I:

(a) Heat seals for test purposes shall be a minimum of 1/2 inch wide and shall be effected on a jaw-type heat sealer conforming to MIL-S-4461, Types I, II, or III having one heated jaw and one resilient unheated jaw, utilizing the sealing conditions recommended by the manufacturer. The upper sealing condition limits on this type sealer, which are considered reasonable for production line sealing operations with respect to commonly available sealing equipment and commercially practical fabrication time are a temperature setting of 525°F, a 3-second dwell time, and a pressure of 60 pounds per square inch.

(b) Electronic seals for test purposes shall be a minimum of 1/16 inch wide and shall be effected on any commercially available electronic type sealer. The upper sealing limits on this type sealer shall be sufficiently high to effect a satisfactory seal and not cause thinning at the inside edges of the seal.

(c) In the securing of the three 1 inch seam strength specimens from their respective samples, care should be taken that the specimens are not removed:

(1) From points in the sealed sample where seal overlapping has occurred.

(2) From points in the sealed sample which were within 1 inch of either end of the sealer jaw during the sealing operation.

4.6.2 Type II:

Cold seals for test purposes shall be a minimum of 1/2" wide and shall be effected on a sealer having two sets of rubber coated pull-wheels and opposing jaws, using the sealing conditions recommended by the manufacturer. The upper sealing condition limit on this type sealer which are considered reasonable for production line sealing operations with respect to commonly available sealing equipment and commercially practical fabrication time is a pressure of 40 pounds per square inch.

4.7 Preparation of equipment for test.

4.7.1 Cleaning.

(a) The utensils and cloths used in the preparation of panels and test specimens shall be clean and free of contamination. Solvents shall be clean and renewed frequently. In all stages of treatment the handling of panels with bare hands shall be avoided. Panels shall not be permitted to contact contaminated surfaces during the cleaning procedure.

(b) After polishing metal panels and test specimens as specified for each procedure they shall be cleaned with surgical gauze and then

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scrubbed in a beaker of hot mineral spirits conforming to Grade 1 of TT-T-291 with a surgical gauze swab. This shall be followed by successive immersions in hot mineral spirits, boiling 95 percent methanol, and boiling absolute methanol and then allowed to dry and stored in a desiccator, until ready for use. If storage of more than 24 hours occurs, the surface preparation shall be repeated starting with the hand polishing.

(c) Apparatus used in the VIA test and exhaustion procedure shall be cleaned in a solution of hot water and soap, followed by a double rinse in hot tap water and a final rinse in distilled water.

(d) Precautions--After all tests, the apparatus shall be thoroughly cleaned as described. Care should be taken to segregate test samples by use of wrapping materials and to avoid contamination. Hands should be washed after handling treated papers and between periods of handling different barriers.

4.8 Test conditions. In general, the physical tests contained in this specification shall be made under the controlled atmosphere conditions having a relative humidity of 50 ±5 percent and a temperature ranging from 70° to 80°F. Waiver of this requirement may be permitted where proper conditioning facilities are not available for control testing. However, for referee purposes, the specified tests shall be made upon the material in the specified atmospheric condition.

4.9 Test methods.

4.9.1 Compatibility with copper.

4.9.1.1 Preparation of test assembly panel. Three panels of cold rolled, hard temper copper conforming to QQ-C-576 and measuring 1/16 by 1/2 by 3 inches shall be polished to remove pits and irregularities from all surfaces. The panels shall be polished with 240 grit aluminum oxide. The use of "wet or dry" paper is prohibited. Iron oxide abrasives shall not be used. The final abrasion shall be in a direction parallel to the length of the panel. Each panel shall be bent into a "U" shape having a radius of 1/4 inch and a distance of 1/2 inch between side walls at the ends. A sample of treated barrier material measuring 3/4 by 3-1/2 inches shall be tightly wrapped around each "U" shaped panel with the treated or effective side to match, so that the material is perpendicular to the longitudinal axis and at the base of the open section of the "U". The treated barrier shall be secured with white nylon thread conforming to MIL-T-7807. A glass jar of one pint capacity measuring approximately 2-1/2 inches in height shall be used.

4.9.1.2 Procedure. Fifty ml of a solution of synthetic glycerine and distilled water having a specific gravity of 1.103 at 75° ±3°F. (23.9 ±1.7°C.) shall be poured into the test jar to provide a relative humidity of 85 ±3 percent at 150° ±2°F. (65.6° ±1.1°C.). A glass vessel suitable for use as a stage shall be inverted and placed inside the test jar. The three wrapped panels shall be placed around the perimeter of the stage with both legs of the inverted "U" resting on the stage in the test jar avoiding contact with glycerine solution. The test jar shall be sealed with a screw cap using an aluminum foil gasket and placed

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in a circulating air oven at 150° ±2°F. (65.6° ±1.1°C.) for 7 days. The test jar shall then be removed from the oven, allowed to cool, and the copper panels removed and unwrapped. The "U" shaped specimen shall be examined on the inside surface of the "U" for evidence of corrosive effects from the vapor, such as pitting, etching, or sever discoloration. Light brown, purplish, bluish, or "peacocking" stains or any slight discoloration normally associated with light oxidation of copper shall not be considered corrosive effects for the purpose of this test. Corrosive effects on the outside surface of the "U" shaped specimen shall not be considered cause for rejection.

4.9.2 Tests from Fed. Test Method Std. 101. The following tests shall be conducted in accordance with the methods specified under Federal Test Method Standard 101:

Test	Fed. Std. 101 Method
VIA	4031, procedure B
VIA exhaustion	4031,
Contact corrosivity	3005
Blocking resistance	3003, procedure A
Water resistance to marking	3027 (Change 2)
Transparency	4034
Puncture resistance	2065
Tear strength	2036

4.9.3 Long term protection.

4.9.3.1 Preparation of panel. Three 2 by 4 by 1/8 inch, cold rolled 1020 steel panels required for this test shall be finished and cleaned as specified for the contact corrosivity test specimens. Edges of the panel shall be rounded and two 1/8-inch diameter holes drilled at opposite corners of the 4 inch side.

4.9.3.2 Assembly and exposure. The panels shall be placed individually in a 3 by 5 inch (inside dimensions) pouch fabricated from the material with the interior surface being the treated side. After insertion of the panel, the excess air shall be exhausted from the pouch by hand, and the pouch sealed. The resultant assemblies shall then be exposed outdoors for 12 months in a louvered shed. Upon completion of this exposure period the panels shall be examined visually for conformance to the long term protection requirement in Table I.

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4.9.4 Seam strength.

4.9.4.1 Seam strength sampling. Six by 12 inch sections for this test shall be selected from the applicable samples.

4.9.4.2 Seam strength (as received).

4.9.4.2.1 Preparation of test specimen. The treated barrier for this test shall be folded in half with the crease parallel to the long axis. The open or unfolded length shall be sealed and the folded length cut off. From this, three adjacent 1 inch wide specimens shall be cut perpendicular to the seam.

4.9.4.2.2 Test at room temperature. The three 1 inch wide specimens selected for this test shall be opened and one end of each specimen shall be clamped so that the other end of the specimen hangs freely. A 1/2 pound weight shall then be gently attached to the free end of the specimen so as not to impact load the seal. The weight shall be allowed to act for 5 minutes, whereupon the weight shall be removed and the specimen examined for separation of the seal faces.

4.9.4.3 Seam strength (sealed after aging).

4.9.4.3.1 Test specimens. The treated barrier for this test, in the flat unsealed condition as taken from the sample roll shall be aged in a circulating air oven maintained at 150° ±2°F. for 12 consecutive days (288 hours). After removal from the oven the unsealed sections shall be allowed to come to room temperature. Test specimens shall then be obtained as described in 4.9.4.2.1.

4.9.4.3.2 Test at room temperature. The three 1 inch wide specimens selected for this test shall be tested as specified in paragraph 4.9.4.2.2.

4.9.5 Oil resistance.

4.9.5.1 Preparation of test assembly. Six steel panels, 2 by 4 by 1/8 inches weighing approximately 4 ozs. shall be cleaned as specified in 4.7.1. Three of the panels shall be individually immersed for one minute at 75° ±5°F. in a petroleum base oil conforming with Type VI of TT-S-735 (ASTM oil No. 3). Upon removal, the panels shall be permitted to drain for one hour. The panels shall then be individually placed in a 3 by 5 inch (inside dimensions) pouch fabricated from the treated barrier. After insertion of the panel in the pouches, the excess air shall be exhausted from the pouch by hand, the pouch sealed and wrapped in white filter paper fastened by paper clips. The same procedure shall be repeated by immersing the remaining three panels in di-2 ethyl hexyl sebacate.

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4.9.5.2 Test procedure. The assembled pouches shall be hung in an oven maintained at 150° ±2°F. for 72 hours. Upon removal, the assemblies shall be permitted to come to room temperature, and examined for oil leakage, delamination, dissolution, or embrittlement. Oil leakage shall be determined by the appearance of oil stains on the filter paper. Inability of the treated barrier to contain the coated panel shall also be considered as cause for rejection.

4.9.6 Low temperature flexibility.

4.9.6.1 Preparation of specimens. Cut five specimens, 4 inches by 12 inches, and condition for 3 hours at -25° ±2°F. The specimens shall be arranged in the cabinet in a manner which allows circulation of air against all surfaces of the specimens.

4.9.6.2 Procedure. After conditioning for 3 hours, each specimen shall be drawn over a 1/4-inch diameter round steel mandrel at the conditioning temperature in such a manner that the specimen is subjected to a 180° bend. The mandrel shall be placed in the low temperature cabinet at least 1/2 hour prior to the flexing operation. This operation shall take 2 to 3 seconds for a complete draw over the mandrel. Each specimen shall be drawn over the mandrel three times, and then turned over so that the opposite face is toward the mandrel and the drawing process repeated as above.

4.9.7 Seam and material water resistance.

4.9.7.1 Preparation of reagent. To each 98-ml portion of distilled water add 1 gram of erosol OT, or approved substantial equal, and 1 gram of Erythrosin B, or approved substantial equal. Allow the mixture to stand with occasional shaking for 4 hours.

4.9.7.2 Procedure. Ten bags having inside dimensions of 5 by 6 inches, shall be completely filled (but not to the extent of placing a strain on the bag material or seams), with shredded white absorbent paper (unwaxed) and sealed. The sealed bags shall then be immersed for 5 minutes under a 1-inch head of water maintained at a temperature of 73° ±2°F. to which has been added the reagent specified in 4.9.7.1 in the proportion of 1 part (by volume) of reagent to 4 parts (by volume) of water. At the end of 5 minutes, remove the bags from the water, allow them to drain, cut open one edge, and examine the shredded paper for evidence of staining. Absence of staining shall indicate that sample bags resisted penetration of water.

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4.9.8 Storage stability. Sufficient treated barrier in roll or Type I flat cuts to conduct the tests indicated below plus additional material for two retests shall be overwrapped with one layer of MIL-B-131, Class 1 barrier material and placed in storage for one year. After the one year storage the MIL-B-131 barrier material shall be removed, and the treated barrier shall be tested for conformance to:

Seam strength.

Vapor inhibitor ability (VIA).

Transparency.

5. PREPARATION FOR DELIVERY

5.1 Application. The packaging, packing, and marking requirements specified herein apply only to direct purchases by or direct shipments to the Government.

5.2 Packaging. Packaging shall be Level A or C as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 Rolls. Each roll shall be wound on a core with a minimum diameter of 3 inches and restrained from unwinding. The rolls shall be wrapped with at least one thickness of barrier material conforming to MIL-B-131, Class 1. Each roll shall be completely wrapped and closed at the ends by means of inside and outside headers, with all seams and joints sealed with pressure-sensitive tape conforming to PPP-T-60. An identification sheet shall be inserted in each roll with the information required in paragraph 3.4.2.

5.2.1.2 Flat cuts (Type I only). Flat cuts in quantities as specified (see 6.2), shall be bundled by sandwiching between two fiberboard pads conforming to PPP-B-636. Bundles shall be overwrapped and sealed as specified for rolls in 5.2.1.1. Unless otherwise specified, bundles shall be individually packaged in fiberboard boxes conforming to PPP-B-636, Type SF, Class Weather resistant, Grade V3s. An identification sheet shall be inserted in each bundle with the information required in paragraph 3.4.2. Box closures shall conform to the appendix to the box specification. Type II material does not lend itself to flat cuts.

5.2.2 Level C (commercial packaging). Barrier material shall be packaged to afford adequate protection against physical damage during shipment from the supplier to the first receiving activity. The package and the quantity per package shall be the same as that normally used by the supplier for retail distribution.

5.3 Packing. Packing shall be Level A, B or C as specified (see 6.2).

5.3.1 Level A

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5.3.1.1 Rolls. Rolls shall be packed in fiber drums conforming to Type III, Grade D of PP-D-723; fiberboard shipping containers, conforming to PPP-B-636, Type CF or SF, Class Grade V3C, Weather resistant, Style RSC; or triple wall fiberboard of PPP-B-640, Class 2, Style A. Closures shall be effected with waterproof tape in accordance with the applicable container specification.

5.3.1.2 Flat cuts. Flat cuts packaged as in 5.2.1.2 shall be packed in containers conforming to PPP-B-636, Type CF or SF, Class Grade V3, Weather resistant, Style RSC; PPP-B-640, Class 2, Style A. Closures shall be effected with waterproof tape in accordance with the applicable container specification.

5.3.2 Level B.

5.3.2.1 Rolls. Rolls of material shall be packed in fiber drums conforming to Type I, Grade A of PPP-D-723, fiberboard shipping containers conforming to Type CF or SF, Class Domestic, Style RSC of PP-B-636, or triplewall fiberboard of PPP-B-640, Class 1. Closures shall be in accordance with the applicable specification.

5.3.2.2 Flat cuts. Flat cuts packaged as specified in 5.2.1 shall be packed in containers conforming to PPP-B-636, Type CF or SF, Class Domestic, Style RSC; PPP-B-640, Class 1, Style A.

5.3.3 Level C (Commercial packaging). Barrier material, packaged as specified in 5.2, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. The quantity per shipping container shall be the same as that normally used by the supplier for retail distribution. Containers shall comply with U.S. Postal Service, Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.4 Marking. All individual packages (see 3.4) and shipping containers shall be marked for shipment in accordance with MIL-STD-129 and as follows:

Federal Stock No. or other identification No. as specified in purchase document.
Type.
Specification number and title.
Manufacturer's Sealing Conditions.
Formula No. or Brand Name.
Contract or Order Number.
Size--Nominal net lineal yardage of roll or dimensions of Type I flat cuts (Net lineal yardage is the number of yards of usable material in the rolls).
Date of Manufacture (month and year).

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5.4.1 Precautionary marking for stocking and storing. The following marking shall appear on at least one side and wherever practicable on two sides of each wrapped roll or box:

KEEP COOL AND DRY.
PLACE PARTIAL USED ROLLS IN FIBER CONTAINERS (EXTERIOR CONTAINERS).
STAND ROLLS ON END*.

*This requirement applies to roll stock only.

5.4.1.1 Handling marking. By a separate set of markings include the following on both rolls and flat cut containers:

HANDLING PRECAUTIONS.
DO NOT RUB OR WIPE EYES WHILE HANDLING THIS PRODUCT.
AFTER HANDLING WASH HANDS THOROUGHLY WITH SOAP AND WATER.
(This product contains materials which may be an irritant to eyes and skin).

6. NOTES

6.1 Intended use. The VCI treated barrier materials, covered by this specification, are intended, but not limited to, uses where transparency is desired to facilitate inspection of the item without disturbing the package. The packages fabricated from these VCI treated barriers are intended mainly for interior and intermediate packaging procedures.

6.1.1 Type I. Type I material is intended for use where a heat sealable, VCI treated barrier material is required.

6.1.2 Type II. Type II material is intended for use where either production processing, or custom hand processing, requires a cold-sealable, VCI treated barrier material.

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6.2 Ordering data. Requests, requisitions, schedules, and contracts or orders should contain the following:

(a) Title, number and date of this specification

(b) Type, as applicable

(c) Quantity

(d) Form (Rolls or Flat Cuts) (3.3)

(e) Flat cuts (Type I) (Specify width and length) (3.3)

(f) Number of flat cuts in bundle (See 4.2.1.2)

(g) Level of packaging and level of packing required (5.2, 5.3)

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Commander, Naval Air Systems Command, Department of the Navy, Washington, D.C. 20360; however, information pertaining to qualification of products may be obtained from the Director, Aero Materials Department, Naval Air Development Center, Warminster, Pennsylvania 18974.

6.3.1 It is understood, after receipt of the letter of authorization, that samples shall be furnished at no cost to the Government, and that the manufacturer will pay all transportation charges to and from the point where the tests are made. In case of failure of the sample or samples submitted, consideration will be given to the request of the manufacturer for additional tests only after it has been clearly shown that changes have been made in the product which the Government considers sufficient to warrant additional tests. The cost of retests will be borne by the manufacturer.

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NAVY - AS
Air Force - 69

Review Activities:

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NAVY - SH, YD, SA,
AIR FORCE - 71, 84

User Activities:
NAVY - MC, CG
ARMY - MU, WC
DSA - CS

Preparing Activity
NAVY - AS
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